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Progress Through Research



*How to get more and more from the feed and care given farm animals
is the object of continued investigations.*

FIFTY-EIGHTH ANNUAL REPORT
OF THE
AGRICULTURAL EXPERIMENT STATION

UNIVERSITY OF MARYLAND
COLLEGE PARK, MARYLAND

1944-1945

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Visitors will be welcome at all times, and will be given every opportunity to inspect the work of the Station in all its departments.

The Bulletins and Reports of the Station will be mailed free of charge to all residents of the State who request them.

ADDRESS:

AGRICULTURAL EXPERIMENT STATION
COLLEGE PARK, MARYLAND

*To the Governor of Maryland, the Board of Regents,
and the President of the University of Maryland:*

I transmit herewith the Fifty-Eighth Annual Report of the University of Maryland Agricultural Experiment Station, as established by Act of Congress, March 2, 1887, containing an account of research and experiments conducted during the fiscal year ending June 30, 1945, and a statement of the receipts and disbursements for the same period.

W. B. KEMP,

Director.

UNIVERSITY OF MARYLAND

AGRICULTURAL EXPERIMENT STATION

Volume 58

1944-1945

Progress Through Research

Being

The Fifty-Eighth Annual Report

For the Fiscal Year ending June 30, 1945

By W. B. KEMP, Director

THE following pages contain a review of research in which definite conclusions have been reached during the year. A look at these findings shows that chief stress has been laid upon means for increasing volume and quality of human food in the state. These studies have dealt with food for man either directly, or indirectly, through the more efficient production and use of feed for livestock.

Many of the findings that formerly were published in station bulletins now appear in scientific journal articles. A list of such articles appears in this report together with the bulletins that were issued. Preliminary findings that are not yet ready for such publication are presented in brief summary.

Studies designed to improve the appearance and retain the palatability of dehydrated fruits and vegetables have attracted much attention. Also, recent discoveries of essential dietary needs have made it advisable to restudy the losses that may be expected as a result of the processes used in canning.

Shortages among the supplements usually used in feeds for chickens, hogs and cattle have made it necessary to discover sub-

stitute materials together with modified treatment and use of standard materials in order that increased efficiency in their use may be obtained. New and improved insecticides have been tested. New combinations have been formulated to enhance their efficiency, and new machines have been designed and built for their most effective application in the field. Economic studies have been made of the rapid change in farm real estate prices, improved methods for obtaining equitable assessments of farm properties, and the economies resulting from increased use of labor-saving machinery.

As the war draws to a close it is to be expected that the station will terminate those projects designed primarily to aid in the war efforts and will renew or accelerate those designed to aid peacetime agriculture.

A Summary of Progress in Research

FACTS IN THE ECONOMIC SITUATION

FARM ORGANIZATION AND MANAGEMENT

Wartime Adjustments in Production—Agricultural production in Maryland has increased about 40 percent since the beginning of the war, in spite of shortages of labor, machinery and certain materials. By working long hours, making use of women, children and elderly persons for farm work, and by exchanging machinery, farmers have produced more than in any previous period.

Considerable shifting of emphasis on enterprises is to be expected, but agricultural production in general is at or near the peak. Further expansion will be controlled by the supply of labor and machinery and the prices of farm products.

Factual information on feasible production and adjustments in agricultural production, together with probable postwar changes in rural institutions is presented in the following publications: "Maryland Agriculture's Wartime Production Capacity in 1945," published in July, 1944; "Farm Economics, Farm Labor and Adjustments in Management Practices in Maryland for 1945," published in July, 1944; "Rural Institutions" (roads, taxes, credit and tenure), published in July, 1944; and "Production of Maryland Tobacco," published in September, 1944.

Postwar Plans of Farmers—Maryland farmers expect to spend \$72,670,000 for improvements to the farm plant and for household equipment and general farm services in the first two postwar years. This was shown by a state-wide survey.

The anticipated expenditures will be divided as follows: Farm machinery and equipment, \$36,990,000; farm buildings, \$27,410,000; general services, such as fencing, electricity, water systems, heating systems and sewage disposal, \$3,940,000; and household equipment, \$4,330,000. Over the longer postwar period, expenditures are expected to be considerably larger. For new buildings and repairs to old buildings they may amount to \$40,000,000.

Farmers are planning greater use of mechanical power and heavier implements. The survey showed that approximately 40 percent plan to buy some type of motor vehicle and about 30 percent plan to buy tractors. About 70 percent of the total building expenditures will be for construction of new buildings, and 30 percent for repairs. Refrigerators, bathroom fixtures and washing machines account for 73 percent of the expected expenditures for household equipment.

About 34 percent of the postwar improvements are expected to be financed from savings, 54 percent from current income, and about 12 percent from loans.

Information obtained in this survey can be used in planning programs for postwar adjustments in agriculture; as a basis for making adequate credit available to farmers; and as a means of measuring the demand for farm equipment and building materials.

Trends in Farm Mortgage Financing—The volume of mortgages filed in recent years has been large, as also has been the volume of mortgages paid and released of record. These facts indicate either a shifting of mortgage debt from one group of farms to another, or large scale refinancing of the existing mortgage debt in order to obtain more favorable terms.

Recently there has been a tendency for farm mortgage financing to be shifted to private lenders, commercial banks, mortgage companies, etc., and a decrease in new financing by the Federal Land Banks and life insurance companies. There is also a tendency towards shorter term mortgage loans of 3, 5 and 11 years duration.

These facts were revealed by a study of data on all farm mortgages filed for record in the period from January 1, 1936 to July 1, 1944, inclusive, on tracts of 10 acres or more, in five Maryland counties. The counties were Somerset, Queen Annes, St. Marys, Frederick and Harford.

FARM TAXATION AND FINANCE

Postwar Tax Problems—Normal expenditures of the Federal government will increase after this war, as they have following previous wars. Consequently, a substantial portion of tax resources will be preempted for Federal purposes, leaving a more limited tax field for state and local governments.

Increasing costs of services will confront state and local governments in the postwar period. Higher standards of education were established in legislation enacted by the Maryland General Assembly of 1945. Rural people will demand more all-weather roads to meet needs of a more highly mechanized agriculture. Unemployment and social welfare programs will place direct responsibilities upon the state and local governments.

Three governmental functions account for the major part of state and local expenditures in Maryland. They are public education, highways and public welfare.

County tax rates for all school purposes averaged 73.5 cents per \$100 of assessed valuation for the 20 years ending in 1943-44. Current school expenses required 60 cents of the average tax

rate, and capital outlay accounted for an average of 13.5 cents, or 18 percent of the total levy. Thus, with a minimum current school tax rate of 56 cents, postwar prospects are for an average total school levy of 68 cents or more.

In 1943, about 53 percent of the county road mileage in Maryland was unsurfaced, or soil surface. Little surfacing has been done during the war. The condition of county roads varies widely among counties. For example, only 4 percent of the county road mileage of Baltimore county is unsurfaced as contrasted with 97 percent in Queen Annes County, and 90 percent and 91 percent, respectively, for Caroline and Worcester counties.

It is estimated that the postwar cost of the counties' share of the public welfare program in Maryland will be about \$1,545,000. The tax rate to support the welfare program will vary from 2.6 cents in Baltimore county and 2.7 cents in Montgomery county to 16.6 cents in Somerset county.

Classification of Farm Land for Property Tax—Acreages in land assessment classes vary widely from actual land-use classes of farm land in Maryland. This is shown by detailed data on land capability classes and tax assessment classes obtained from the U. S. Soil Conservation Service and from county tax records. Failure to keep assessment land classes up-to-date results in an average misplacement of about 10 percent in the tax on farms studied, and the average misplacement is 20 percent for 40 percent of the farms.

Factual information regarding outstanding and scientific work in assessing farm property, together with facts pertaining to the property tax of Maryland, is presented in Bulletin No. A36, entitled "Improving Farm Property Assessments in Maryland," published in January, 1945.

MARKETING FARM PRODUCTS

Transporting Farm Products by Motor Truck—Forty percent of the vehicle loads of farm products delivered to marketing concentration points in Maryland are transported by farmers' standard trucks, 25 percent by farmers' pick-up trucks, and 20 percent by farmers' automobiles. The use of farmers' automobiles and pick-up trucks in hauling farm products is confined largely to hauling products of high intrinsic value and perishable in nature.

The average load of farm products carried by commercial hire trucks is 4,400 pounds, as compared with 3,190 pounds for regular farm trucks, 748 pounds for pick-up trucks and 370 pounds for automobiles. Farmers can reduce motor vehicle mileage in hauling farm products to market by loading more nearly to capacity and by cooperating with one another.

Products hauled on farms in Maryland amount to a tonnage

80 percent greater than the tonnage of farm products hauled to market.

There are approximately 417 stores in Maryland selling feed or fertilizer, or both. About 850,000 tons of farm supplies were transported to farms in the state in 1943, and feeds constituted 45 percent of that volume. One-half of the feed dealers and two-thirds of the fertilizer dealers make delivery charges, mostly a flat rate of \$1.00 per ton for feed and 75 cents per ton for fertilizer.

Information regarding truck transportation of farm supplies shows the use of such facilities under a wartime conservation program, and points to possibilities for further conservation. In addition, the data should serve in peacetime in developing farm transportation services that are free from excessive overlapping and duplication.

More detailed information about this study, and also the one pertaining to transportation of farm products, is given in Bulletin No. A34, entitled "Wartime Transportation of Farm Products and Supplies by Motor Vehicles in Maryland".

Marketing Problems in the Postwar Period—The war affected material changes in the marketing of farm products. Transportation facilities were limited, in spite of the fact that there was greater output of food products. The pressure of wartime activity developed a tremendous need for additional facilities for assembling, storing, warehousing and terminal market operations. Improvements in these facilities would help to stabilize market supplies, reduce waste, and facilitate the handling and distribution of food products.

Most of the problems in connection with handling perishable produce in Baltimore are confined to the Camden and Marsh Markets. Improvements in both markets are needed. On the basis of studies made, the cost of acquiring properties, together with other costs in connection with market improvements, would amount to \$3,750,000 to \$4,750,000. These costs cover improvements to the concentrated Camden Market area and new construction in the outlying Camden Market area for new produce buildings and space for the farmers' market to accommodate approximately 400 trucks. Revenues from rental of stores, rental of stalls to farmers, and the licensing of merchants who operate in the farmers' market would not be sufficient to finance more than two-thirds of the original cost of improvements, and some governmental financial assistance would appear necessary.

Five reports covering improvement possibilities, cost of acquiring properties, cost of new construction, methods of financing market improvements in cities in other states and in Baltimore City have been presented to the Governor's Market Commission.

LAND ECONOMICS

Farm Tenancy and Leasing Arrangements—Information regarding the division of income and expenses, leasing arrangements and various tenancy problems was obtained for 80 farms in Southern Maryland. Sixty-three of the 80 farms are operated by tenants, and 17 are operated by share croppers. Written leases are used on about 25 percent of the farms, the remaining 75 percent using verbal leases. All rental payments on the 80 farms are on a crop share basis, there being no cash rent or standing rent. A few tenants raise livestock on a share basis in addition to crops.

The most prevalent method of sharing the tobacco income is on a half-and-half basis. Eighty-nine percent of the tenants and 70 percent of the share croppers are using this method. Eleven percent of the tenants and 30 percent of the share croppers interviewed shared the tobacco income on a two-thirds, one-third basis.

Prior to 1943, the law specified that a six-months notice in advance had to be given in terminating a lease. In 1943, the State Legislature passed an Act making three-months notice of termination legal. No tenants knew about this change and very few landlords had any knowledge of the Act.

Information obtained in this study will be useful as a basis for developing equitable lease forms for tenants and landlords, and to assist and guide young people, war workers and returning servicemen who are beginning farming as tenants.

Trends in Farm Real Estate—Farm real estate values in Maryland have increased 52 percent since the pre-war years, 1935-39. The present level of farm real estate values in the state is 13 percent below the peak reached in the First World War. Values are increasing at about one percent a month, with about one more year to go to be comparable with the corresponding period of the First World War.

Forces tending to favor increased land values are low interest rates from alternative investments, purchase of farms as a hedge against inflation, high farm commodity prices, and an accumulation of liquid funds at the disposal of farmers and others.

Prospective farm purchasers need to be well informed on land values, productivity of the land, soil types, condition, usefulness and adequacy of farm buildings, and adaptable farm enterprises. They should avail themselves of a competent land appraisal service before they buy. Both credit and appraisal values should be based upon normal yields and prices. Encouragement should be given to transfer of farms to bona fide farmers rather than to land speculators.

Prospective farmers with little or no experience will generally be better off if they postpone the purchase of farms until they

have acquired experience as farm tenants or laborers. Where land values have risen unduly, farmers will do well to postpone purchase of farms and use their accumulated savings to retire debts, buy victory bonds, improve the farm and farm plant, and build up cash reserves.

Information about changes in the farm real estate situation, trends in farm transfers, farm mortgage indebtedness, and opportunities for additional workers in agriculture is given in Bulletin No. A35, entitled "The Farm Real Estate Situation in Maryland."

AGRICULTURAL ENGINEERING

Sweet Potato Curing and Storing—Further valuable information was obtained from work in the Experiment Station sweet potato houses. It shows the need for more detailed studies, especially on the Maryland Golden variety, which is so common in the state.

The effect of pre-storage history on the keeping ability of sweet potatoes was brought out more than ever before. Sweet potatoes from the Station farm, from two growers in Anne Arundel County and from one grower in Wicomico County were stored in baskets in the same house. Losses from one lot from Anne Arundel County were more than twice as great as from the other lot, and those from Wicomico County were greater than either. Investigations of the possible factors which may influence keeping quality are being continued on the Station farm, where the various factors can be separated.

Eight baskets of potatoes left outside under canvas for three days after digging were found to deteriorate much more rapidly than similar potatoes stored immediately. The rate of deterioration was particularly great toward the end of the storage season.

Storage in slatted crates has consistently shown higher losses than storage in baskets under both high and low humidity conditions. This, combined with the problem of storing and handling a non-nesting type of container, indicates that this part of the program may be dropped.

No appreciable difference in loss was noted between potatoes cured at 75° F. and similar potatoes cured at 85° F., both at high relative humidity. At 95° F. shrinkage was considerably higher than either at 75° or 85°, and some internal break-down occurred, causing a pithy root. At 105° F. rapid spoilage occurred, with almost complete loss.

More rapid studies of conditions affecting storage can be made in six temperature controlled compartments that have been constructed.

Improved Grain Dryer—Efforts to improve the grain drier developed by the Department were continued. A new outlet unit

was developed with a view to adapting the drier to all of the more common farm grains. This outlet is only slightly affected by varying air pressure and has practically a constant output per turn and wide range of speed. It can be cleaned easily, even with the machine in operation.

FARM CROPS

Corn Hybrids—Sixty-five open pedigree hybrids, 29 privately controlled hybrids, and 3 open pollinated varieties were grown in replicated tests at one or more of eight locations. Drought limited yields for the second consecutive year. As a result, open pollinated varieties again made a comparatively poor showing. Moreover, hybrids varied among themselves in drought tolerance. A noteworthy example was the difference between U. S. 13 and Ohio C12, two double cross hybrids differing in pedigree by only one inbred line. In both 1943 and 1944, Ohio C12 consistently outyielded U. S. 13, its greatest superiority coming in tests where drought was most severe.

Since hybrids are fast replacing open pollinated varieties in Maryland, attention henceforth will be focused upon the comparative performance of hybrids, rather than between hybrids and varieties. In order to facilitate such comparisons from place to place and from year to year, an established hybrid in each of three maturity groups was used as a standard of comparison in each test in 1944. Iowa 939, U. S. 13, and Illinois 448, respectively, were used to represent the early, medium and late maturity groups.

Small Grains—Newly recommended varieties of small grains continued to sustain previous performance records.

Thorne wheat, an awnless variety selected by the Ohio Station from a cross between Portage and Fulcaster, continued to demonstrate its usefulness in Maryland. It has a 3-year yield record slightly better than that of Leapland, another popular awnless variety widely grown in the state. In addition to good productivity, Thorne is outstanding for stiffness of straw and winter hardiness. It is especially recommended as a substitute for Leapland where winter injury is likely to be of importance, as for example, late seedings and at the higher altitudes of Western Maryland.

Wong barley continued to give high promise in areas where winter barley can be grown successfully. Its yielding ability, stiffness of straw, and freedom from mildew have made it a favorite among farmers.

Winter oats varieties Lee, Fulwin, and winter-type Fulghum continue to yield on about the same level and to lead the test at College Park.

Soybeans—Illini, Mingo, Manchu, and Lincoln were the leading varieties in 1944 on the basis of average grain yields in tests at College Park and Ridgely. When drilled in 3-foot rows and cultivated, these varieties averaged from 26.6 to 27.8 bushels of seed per acre. The average for these four varieties was 5.3 bushels, or 24 percent, above the average grain yield for Wilson 5 and Kingwa, two popular hay type varieties.

Fertilizing the Corn Crop—During the dry season of 1944 a checker board fertilizer experiment with field corn was duplicated on a heavy soil and on a light soil. Yields were obtained for individual treatments alone and in combination with others resulting from the use of three plow-under comparisons in one direction and with two planter and three side dressing comparisons in the other directions. Under abnormally dry conditions prevailing for this season, it was concluded: 1. That plowing under 150 lbs. per acre of ammonium nitrate, or its nitrogen equivalent, in a 7-7-7 mixture (700 lbs. per acre) was profitable; 2. That plant fertilization may sometimes be harmful—occasionally by injuring seedlings in a dry, sandy seed bed, and more frequently by limiting yields when there is not enough moisture to carry the stimulated plant to maturity; 3. That nitrate side dressing did not prove beneficial in a dry year.

Tobacco Curing—In a curing test conducted in 1944, it was found that tobacco cured with a low humidity, and later incidentally exposed to high humidity, produced a desirable leaf coloring. This test was repeated in 1945 with 60 percent humidity under controlled conditions and satisfactory results were obtained.

Tobacco cured in two barns operated at 90 percent and 85 percent humidity showed that these humidities were too high for large tobacco of the broad leaf variety, although satisfactory results were obtained at those humidities in previous tests.

Two days of wet weather during curing produced considerable house burn in tobacco cured in a check barn operated similar to methods used by farmers.

Treatment with a fungicide gave unsatisfactory results. The chemical did not control insects, nor prevent tobacco from strutting or house burning. The material apparently killed the tissue of the leaf, thereby producing an undesirable discoloration of the tobacco and injuring its quality.

FEEDING AND BREEDING LIVESTOCK

Wintering Rations for Pregnant Ewes—Although a poor quality of corn silage was fed, lambs born in both medium and heavy silage fed lots of ewes were slightly heavier at birth than those born to the ewes receiving no silage in their ration. There was

little difference in the rate of gain of surviving lambs in the various lots. Ten of 13 lambs born in the all hay roughage lot survived, 5 of 10 in the heavy silage lot, and 8 of 10 in the medium silage-medium hay roughage lot.

Ewes fed the heavy silage ration held their weights better throughout pregnancy and lactation than either of the other lots. The medium silage-medium hay roughage lot was intermediate in this respect. Silage fed ewes (both lots) showed more condition and vigor at lambing time and at the close of the experiment. They also grew longer and heavier fleeces (grease weights).

Corn silage in the winter rations of pregnant ewes reduces costs. Feeding at a rate of 17.5 pounds daily per 1,000 pounds liveweight with mixed hay in like quantities has given very satisfactory results. Feeding at double this rate, with hay feeding at a level of 8.75 pounds daily per 1,000 pounds weight, has proved unsatisfactory because of lowered vitality of lambs produced. These results indicate the need for a greater proportion of the roughage feed in the form of good hay in the rations of pregnant and lactating ewes than is needed for pregnant and lactating beef cows.

Progress Toward a New Breed of Swine—This work had reached the stage in 1944 which gave hogs of very acceptable type for present-day market requirements. The hogs at this stage were black spotted, of good length and depth of side and had excellent hams. These hogs on slaughter produced carcasses of excellent shape and quality, which met with full approval of the meat trade. They were $\frac{5}{8}$ Landrace blood and $\frac{3}{8}$ Berkshire blood.

Since the type of hog at this concentration of Landrace blood met the general description of the hog as originally contemplated, with the exception of showing $\frac{5}{8}$ rather than 13/16 Landrace blood, and of being more spotted than planned, it was deemed advisable to expand numbers at this point and through selection to establish a more desirable color pattern.

When numbers are sufficient, another backcross to purebred Landrace stock will be made strictly on an experimental basis. If such crossing produces a still more desirable type of hog than that already produced, such a procedure will be followed generally and the foundation established at this concentration of Landrace blood.

This experiment is conducted cooperatively with the Animal Husbandry Division of the U. S. Department of Agriculture.

Wintering Rations for Pregnant Beef Cows—Corn silage can be fed as the sole roughage ration for brood cows when properly supplemented with protein and lime. Its use reduces wintering costs, the cows remain in a more vigorous and better condition,

and produce heavier calves at birth and calves which gain at a rate equal to or above that of calves born to hay fed cows.

A roughage ration of corn silage supplemented with soybean oilmeal and lime was compared with one consisting entirely of mixed clover-light timothy hay. Cows in both groups were grain fed after calving, at the rate of 6 pounds of grain per head daily in the first test, and 3 pounds per head daily in the second test.

Both groups of cows were thin at the beginning of the second year's test and both groups gained weight during its progress. The cows in the lot receiving hay made an average gain of 12.4 pounds and those fed silage averaged 40.4 pounds. The difference, though less pronounced, was in the same direction as in a previous trial.

Calves born to the silage fed cows, between the close of the first year's test and prior to May, 1945, averaged 65.7 pounds at birth and gained at the rate of 1.48 pounds daily throughout the winter period. Those born to the hay fed cows during the same period averaged 55.5 pounds at birth and gained at the rate of 1.47 pounds daily during the winter period.

The silage fed cows were, in general, thriftier, in better condition, and showed better coats at the close of the second year's test.

Silage fed during the 1944-45 test was of poor quality, having been put into the silo after several hard frosts. It was almost devoid of green color, higher in moisture and crude fibre content than the silage fed in the first trial, and contained only approximately 80 percent as much crude protein, fat, and nitrogen-free extract.

One calf born in the silage fed lot during late January, 1945, showed typical symptoms of vitamin A deficiency. Vitamin A and carotene content in the blood plasma was determined. The plasma of cows on the silage ration was low in both carotene and vitamin A. This condition would not be expected where good quality silage was available for feeding. Cod liver oil was fed, beginning on February 2, and continued throughout the test. Calves born later showed no deficiency symptoms.

CONTROL OF PLANT DISEASES

Potatoes—A seedling, developed in cooperation with the U. S. Department of Agriculture, has been introduced and named Marygold. It is a smooth potato with purple eyes and deep cream-colored flesh, which has outyielded Irish Cobbler for the last three years. It tuberizes early and should be an especially valuable early variety for the home garden. During favorable seasons, good stands and large yields of marketable tubers can

be obtained by planting a second crop with early-grown cut seed that is soaked for an hour in a solution of sodium thiocyanate or ethylene chlorhydrin (1 pound in 12 gallons of water) and planted immediately. In seasons when it is hot and dry or unusually wet at planting time, some of the treated seed pieces rot before they come up and various treatments to prevent that condition have been tried with some success. Other chemicals to break the rest period are being tested. Marygold has responded better to treatments for breaking the rest period than any other seedling or variety which has been tested.

The Potomac variety continued to give good results. Many growers like it better than Sequoia because the tubers are not as susceptible to late blight rot, the vines mature earlier, and the tubers do not get as large. It is not suitable for planting in soil that is infested with scab because of its susceptibility to that disease.

With the object of determining their resistance to diseases and insects, their quality, comparative yields, vigor and adaptability in different parts of the state, 29 potato varieties and 131 seedlings, representing 80 crosses, were under observation in 1944, and 33 varieties and 167 seedlings, representing 97 crosses, were planted and observed in 1945.

A number of new seedlings and varieties resistant to various diseases are under observation and will be included in yield tests just as soon as sufficient seed is available.

Sweet Potatoes—Treatment with Spergon decreased the amount of wilt in sweet potatoes from 10.4 percent in check plots to 1.6 percent and increased the yield from 258 lbs. in the check to 436 lbs. Fermate gave very similar results, while Semesan Bel caused a reduction in stand and yield and was no better than check. Mycoban and thiosan were not promising as sweet potato dips.

These results were obtained in a field experiment in which six treatments and five replications were tested. Sweet potato sprouts were dipped in various water solutions of fungicides before transplanting. Records were obtained on stand, amount of wilt, and yield. The experiment was duplicated using the materials in a wax base. A similar experiment, using soil artificially inoculated with wilt or stem rot organisms, was conducted in the greenhouse.

Several sweet potato growers plan to use Spergon to a limited extent as a sprout dip this season.

Strawberries—Approximately 50,000 plants of the Temple variety were sold to strawberry growers having red stele as a problem. Thus, many acres of land which could not be used

because of red stele will again be usable for strawberry production. Plants of the Temple variety were sent to several states for trial.

It has been demonstrated that certain strawberry selections may be immune or highly resistant to the red stele organism for several years and then suddenly become rather severely affected with the disease. This indicates that resistance is either temporary in nature, or that there are several strains of the causal organism. One selection, which was to be introduced as a resistant variety, has been resistant for several years but became infected in 1944 and for that reason was not named. Before any more varieties are introduced as resistant, it is important that they be grown in several types of red stele infested soil for at least five years.

Peppers—Several hybrids have now been secured from the pure lines which were established from haploids occurring in King of the North and World Beater varieties. The seed of these varieties is being multiplied and they will be tested later. Two more haploids have been secured from about 30,000 seeds of an especially selected strain of California Wonder. When this stock has been multiplied and its diploid fertility restored, it will be used in further crosses. This type is especially desirable, since it is the most common type grown in Maryland.

DAIRY CATTLE AND DAIRY PRODUCTS

Vitamin A and Carotene Requirements of Dairy Calves—The importance of feeding good quality hay to dairy calves, especially during the winter season, was emphasized by results obtained from an experiment conducted during the year. From analyses of the carotene content of various grades of hays and considering the minimum requirements of calves for carotene, the poorer grades of hay do not furnish sufficient carotene and if fed for an extended period might lead to poor results.

Previous work at this Station has shown that the requirements for Holstein and Ayrshire calves from 3 to 12 months of age during the winter amount to about 30 micrograms per pound of body weight. Further results have shown that requirements during the summer months amount to about 20 micrograms of carotene per pound of body weight. The reason for the difference in requirements for carotene in summer and winter has not been determined. The requirements for Guernsey calves during the winter have been found to be about 34 micrograms of carotene per pound of body weight. While these are slightly higher than for Holstein and Ayrshire calves, the difference is not as great as has been reported elsewhere.

Feeding of colostrum milk to calves has shown that it increases the vitamin A content of the blood plasma of a new-born calf by five-fold. When the colostrum milk was withheld and whole milk fed, the vitamin A in the blood of new-born calves increased very slowly and several calves died. These results show that colostrum is an excellent source of vitamin A and that calves should be left on the cow for the first three days of life in order to build up a reserve of vitamin A in the body.

Normal Age Variations of the Intra-Ocular Tension of Dairy Cattle—From a practical point of view, it is desirable to be able to diagnose vitamin A deficiency in the field. One means of diagnosis is by observation of the interior of the eye with an ophthalmoscope for evidence of papilledema. It has been noted, however, that papilledema developed more readily in younger animals. Apparently this was due to variations in intra-ocular tension of the eye due to age. In order to evaluate the eye examination method and know its limitations, it was necessary to study the normal variations of the intra-ocular tension in dairy cattle due to age.

Measurements of intra-ocular tension were obtained on approximately 60 animals. The average for calves from birth to 3 months of age was about 15 m.m. of mercury. From 3 to 18 months of age, 23 m.m.; from 18 months to 3 years, 26 m.m.; and from 3 to 13 years, 30 m.m. Hence, the normal increase in intra-ocular tension with age explains why older cattle do not develop papilledema as readily as young calves. Variations within age groups also explain variations noted in different animals of the same age.

Ophthalmoscopic examination is the only method available at present for diagnosis of milk vitamin A deficiency in dairy cattle in the field. Animals have been found in the field which appeared normal in every respect except for the eye changes noted by ophthalmoscopic examinations.

Value of Vitamins A and D and Nicotinic Acid in Prevention and Care of Calf Scours and Pneumonia in Calves—Capsules, pills, tablets, etc., containing vitamin A, vitamin D and nicotinic acid, which are supposed to prevent scours and pneumonia in young calves, have been available to dairymen during the last few years.

Data collected from the University of Maryland herd and several other herds do not indicate any beneficial effect from feeding the capsules. Where every other calf in the herd was fed the capsule as they were born no difference between the two groups was noted. While data indicate the possibility that

vitamin A might be of great importance to the young calf, the dosage and method of feeding remains to be worked out.

Effect of Vitamin A on Milk Production—Commercial products have been placed on the market during the last few years which supposedly stimulate milk production. Preliminary results on feeding one commercial product indicate about 10 percent increase in milk production where it was fed to cows receiving a grain ration, corn silage, clover and timothy hay. The product consisted essentially of a combination of starches, vegetable oils and vitamins A and D from fish liver oils. Further preliminary work indicates that the increase was not due to the vitamins A and D from the fish liver oils. There is some question whether feeding the product will increase milk production during summer. Also, there is indication that the type of oil used may be important.

Effect of Vitamin A Deficiency on Central Nervous System of Dairy Calves—When calves are born to cows fed vitamin A deficient rations, the calves are usually blind, partially paralyzed and otherwise show symptoms of alteration of the central nervous system. Histological studies of the spinal cord have shown myelin degeneration of the nerve tracts. The amount of injury noted would account for the partial paralysis in the calves. These results further emphasize the importance of feeding plenty of good quality roughage during the gestation period.

Rancid Flavor of Raw Milk and Cream—This flavor is recognized as the principal flavor defect of raw milk and raw milk products. Results of studies designed to determine means of preventing the development of rancidity indicate that certain factors affecting its development in normal raw milk or cream are ineffective when applied to products in which rancidity development has been accelerated by homogenization. Addition to normal raw cream of an antioxidant "Avenex Concentrate" (a cereal product) prevented lipolysis and the appearance of rancidity in butter made from this cream. This antioxidant was without appreciable effect upon the lipolysis which occurred in homogenized raw milk. It would appear that Avenex Concentrate and perhaps other antioxidants may be used successfully in controlling rancid flavor development in raw cream butter, provided their use is permitted by health authorities.

THE BATTLE AGAINST INSECT PESTS

Concentrated Sprays—From the work so far, liquefied gas aerosols appear to be a highly effective method of pea aphid control, with many advantages over older methods of insecticide application. Equipment is simple, inexpensive and light

in weight. A small amount of labor is required and treatments can be made rapidly. However, in developing a new method of insect control many problems are encountered, such as injury to plants, mechanical difficulties (nozzle stoppage in this case), container erosion during storage, and effect of wind and rain on success of application. There are numerous engineering problems in developing the most effective equipment.

Most of these obstacles have been overcome. Satisfactory solvents have been added to the aerosol solution which prevent nozzle stoppage caused by recrystallization of DDT at nozzle tips. Container erosion, which also results in nozzle stoppage, has been overcome by addition of organic oxides which neutralize free acids present or resulting from decomposition of DDT. Solutions have been improved to eliminate plant injury; they have also been simplified.

The optimum rate of application appears to be about 8 to 10 pounds of aerosol solution per acre, applied at about 5 to 7 miles per hour. Speeds greater than 8 miles per hour cause mechanical injury to pea vines. Excellent results have been obtained when wind velocities averaged 20 miles per hour. A jeep was found too low for carrying spray equipment through tall peas, but its four-wheel drive was highly satisfactory.

Progress in development of aerosols for control of field crop insects has been highly satisfactory. Another season's work should provide necessary information so that this method of aphid control can be recommended to growers.

Utility of DDT in Control of Poultry Ecto-Parasites—This project has developed to the point where certain announcements can be made with regard to the low toxicity to chickens. Feeding tests were conducted with capsule doses, in the mash, and by feeding flies killed by DDT. Apparently 20 mg. per kilo is not actively toxic to chickens, whether fed in mash or by capsule. Dusting poultry on roosts at night with 20 percent DDT is effective in controlling lice. There is some indication that birds fed DDT are freed from lice.

Disease Resistance of Selected Strains of Honeybees—Resistant queens received in midsummer of 1945 were introduced to nuclei and are now heading medium to weak colonies. Resistant queens received in previous years were distributed to commercial beekeepers for trial, or were used in the college apiary. Some showed marked tendency to swarm, others showed little surplus storing ability, others wintered poorly, and many a surprising susceptibility to develop European Foulbrood.

None of the queens shipped to Maryland developed European Foulbrood or American Foulbrood, although they were kept in

areas, where both diseases are endemic. Colonies headed by resistant queens proved average in honey storing ability, in swarming tendency, and in ability to survive winter.

Queens placed in the hands of a commercial queen breeder and from which queens were bred gave rise to progeny that were considered worth less from the standpoints of swarm tendency, winter resistance and surplus storing ability.

Timing Pea Aphid Treatments—Treatments about blooming time have given best results under the degrees of aphid infestation encountered during the last two years.

In 1945, sprays were applied on April 28, May 4, May 9 and May 13. The peas were 6 to 10 inches tall at the time of the first treatment and the average aphid population was 22 per sweep. Peas were in full bloom on May 9 and pods were forming on May 13. The aphid population began building up rapidly on May 9 and continued to increase until late in the month. On the early treated plots, populations built up to serious proportions before later pods developed.

The standard spray of ground derris root was used in these experiments. Now that DDT has been found so much more effective than the rotenone insecticide, it appears advisable to use this material in place of derris and extend the work over a longer period. The DDT treatment may provide more leeway in time of application.

FRUITS AND VEGETABLES

The Redskin Peach—This variety, which was introduced in January, 1944, continued to show to a high degree the qualities of vigor, productivity, shipability, quality and color which merited its introduction.

The marked vigor which it continued to exhibit under commercial orchard conditions in Western Maryland makes it especially necessary to stress to fruit growers that wider than customary planting distances should be used. It is recommended that not more than 75 trees per acre be planted.

When compared in the frozen pack with 15 standard varieties, Redskin was rated equal to the three having highest rank, namely, Halehaven, Sunhigh and Pacemaker.

Approximately 5,000 buds were requested by nurserymen from various states during the year, and about the same number the previous year. Consequently, the performance of this variety under a very wide range of conditions will soon be known.

Improving Eldorado Blackberry Stock—Blackberry acreage in the Western Maryland producing area has declined rapidly

in recent years. This has been due largely to inability of growers to obtain stock of this well adapted variety which was free from variety and seedling mixtures and also free from the crown-gall disease.

Work designed to provide growers and nurserymen with a source of Eldorado plants both true to name and free from disease was begun several years ago. Individual plants of Eldorado were selected for trueness to type and propagated by the leaf-bud cutting method to obtain freedom from gall. Cuttings were rooted in sterilized sand, shifted to pots containing sterilized soil, and later set in new soil on the Maryland Plant Research Farm. The plants have all fruited satisfactorily and careful inspection shows complete freedom from crown gall. The plants are well established and plants for growers and nurserymen from this foundation stock can now be propagated rapidly.

Breeding Raspberries for Adaptation to Maryland—Production of red raspberries in the Western Maryland commercial area could be increased materially if a variety better adapted to that region were available. The standard variety is Latham and, while hardy to low temperatures in many northern regions, it is especially susceptible to injury under Maryland-type winters.

Most of the new introductions from various experiment stations have been tested. None except Sunrise has proved to be even as reliable as Latham. Unfortunately, Sunrise does not have sufficient size in Maryland for a commercial berry.

An effort to supply this need through a breeding program was started in 1942. While the work was seriously restricted during the war period, approximately 3,500 hybrid seedlings have been produced and grown on the Plant Research Farm near College Park. Of these, about 2,500 have now fruited two years and have been subject to the conditions of two Maryland winters.

One combination of parents has yielded seedlings of outstanding merit, namely, Sunrise X Marcy. Fortunately, slightly more than 1,000 seedlings from this cross were set out the year the work was begun. After two years of close evaluation, about 13 percent of these remain for further testing because of special merits. Among them are several which show unusual promise as potential commercial varieties with greater adaptability to Maryland conditions. Stocks of these will now be increased as rapidly as possible, so they can be tested more widely under conditions prevailing in the commercial area. The breeding work will be continued also.

Vitamin Levels in Canned, Frozen and Dehydrated Peas—An attempt was made to determine the relative merits of three methods of preservation from the standpoint of vitamin levels of peas at the time of serving.

Eight varieties of sweet peas were grown in large enough quantities so that they could be harvested with commercial equipment and threshed in a standard viner. The preponderant sieve size typical of the variety was used in all studies.

Ascorbic Acid—Determinations of ascorbic acid were made on the fresh product and on the canned, frozen and dehydrated products after six months storage, both before and after cooking. Following is a summary of the results:

Two-minute water blanch at 190° F. gave optimum retention of ascorbic acid in the frozen Dark Podded Thomas Laxton and Teton peas. A one-minute blanch was optimum for Canner King, Shasta, and No. 312.

There was considerable varietal variation in the retention of ascorbic acid after frozen and canned storage.

Canned peas, when both peas and liquor are considered, had a higher ascorbid acid content than frozen peas when both were stored six or nine months.

Dehydrated peas stored under carbon dioxide had a higher ascorbic acid content than those stored under air or in vacuum. The dehydrated peas contained only about one-third as much ascorbic acid as the frozen or canned peas.

Canned peas after cooking retained a higher ascorbic acid content than did the frozen peas after cooking.

Ascorbic acid retention (moisture-free basis) of the stored products (after cooking) compared with the original content was 58 percent for the canned material, 53 percent for the frozen material, and 19 percent for the dehydrated material.

Prolongation of the storage period from six to nine months resulted in further appreciable loss in ascorbic acid from the frozen and canned peas.

Carotene and Thiamin—The carotene content of the stored frozen peas was higher than that of the canned or dehydrated peas.

The frozen and canned peas retained about two-thirds and the dehydrated peas about one-half of the original thiamin content.

Chemical and Nutritive Composition of Canned Vegetable Soybeans—There is so much interest in nutrition and the nutritive value of preserved foods that a chemical study was made of canned vegetable soybeans, a comparatively new product on the market.

Soybeans canned at the optimum stage of maturity for preservation as a green vegetable are also at the optimum stage of nutritive value. They may be held for as long as three years without appreciable changes in chemical composition, except for vitamin B₁, which decreases with storage. Compared with other leguminous vegetables canned in the green stage, they contain approximately ten times as much fat; twice the protein, calcium, phosphorus, iron, and vitamin B₁ contents; but less of the vitamins A and C. There are only minor differences in the nutritive value of different varieties but large differences in quality.

Some soybeans tend to gel upon standing after canning. The nature of the gel forming substance has been investigated and found to be a pectin-like gum. Methods for neutralizing this gum, and consequently preventing gel formation, are presented in a bulletin giving the results of the work.

Sweet Corn Varieties for Freezing—Eleven varieties of sweet corn which had proved in previous trials to be well adapted to this area were frozen for comparison. Each variety was husked with a mechanical husker and cut off the cob with a mechanical cutter, thus insuring a uniform cut. The cut corn was mixed thoroughly and fairly large samples taken so that a number of pound packages were frozen. The cut corn was blanched for five minutes in free-flowing steam, after which it was cooled immediately and packaged. These packages were frozen at 25 degrees below zero, in an air blast of 1,000 linear feet per minute, after which they were stored at zero temperature.

After six months, these samples were cooked as for table use and compared on the basis of color, texture, and flavor.

Golden Cross Bantam has generally been considered as a Fancy frozen product. Using it as a standard for comparison, two relatively new varieties, Tendermost and Seneca, 92x28, were classed as Extra Fancy, primarily due to better texture. Aristogold No. 1 was found equal to Golden Cross Bantam, as a fancy product. The next lowest group, which would be considered Fair for freezing, included Ioana, Country Gentleman, Evergreen 14x15, Golden Grain, and Aristogold No. 2. The remaining two varieties, Evergreen (14x15)xH84 and Tri-State, were considered unsuitable for freezing.

Pea Varieties for Freezing—Many varieties of sweet or "sugar" peas, which preliminary trials have indicated might be adapted to Maryland and excellent for canning, have been found entirely unsatisfactory for freezing from the standpoint of edible quality.

Representative samples of the several varieties were washed thoroughly, blanched in hot water at 190 degrees, cooled, pack-

aged and frozen. After storage for six months, samples were cooked and evaluated for color, texture, odor, and flavor. Compared on the basis of these factors, Shasta and Teton, two varieties developed for freezing, were classed as Extra Fancy. Glacier, Thomas Laxton, Laxton's Progress, and Gradah were classed as Fancy. These are the only varieties that will give satisfactory yields in this area and which are recommended for freezing, if a high quality product is desired.

POULTRY

The Place of Soybean Meal in Poultry Rations—A satisfactory diet for growing chickens was developed containing grains, alfalfa meal, 25% soybean oil meal, 4% fish meal, and suitable vitamin and mineral supplements. The fish meal could be replaced by 4% to 7% of dried skimmilk but not by meat scrap. It could be replaced by soybean oil meal if half the total soybean oil meal were replaced by corn gluten meal, or if the diet were supplemented with synthetic dl-methionine. The alfalfa meal could be replaced by dehydrated pea vines. It was necessary that the diet contain sufficient of a high-potency riboflavin supplement to furnish 100 micrograms of riboflavin per 100 grams of diet.

A satisfactory laying mash of similar composition was developed which contained soybean oil meal and corn gluten meal, but no fish meal.

Variability in the Feeding Value of Soybean Oil Meals—When each of 14 lots of commercial soybean oil meal, representing 7 brands, was fed to chickens as sole protein supplement in a practical mash formula, average weight at 9 weeks of age ranged from 75% to 99% of the weights of positive groups. When soybean oil meal was heated at 128° C., nutritive value was very readily impaired by overheating. Very careful regulation of time of heating at this temperature was essential. There appeared to be little possibility of overheating at 104° C. When meal was heated 2½ minutes at 120° C., nutritive value was not affected by variations in moisture content between 2% and 15%, by variations in pH between 4.9 and 6.5, nor by presence or absence of soybean oil. There was less improvement due to heating if the meal was previously dried to a moisture content of less than 2%.

Role of Wheat in Pullet Disease—Apparently, low germination alone is an unreliable index of the effects of wheat in causing pullet disease. This is indicated by the fact that bin damage induced by harvesting and storing wheat in various ways resulted in reduced germination to as low as 4.5% without producing pullet disease.

During the summer of 1944, a field of about 9 acres of Leapland wheat was divided into 5 lots and harvested and stored in different ways calculated to affect the moisture content. Various amounts of bin damage were induced and germination was adversely affected. These wheats failed to show the presence of organisms characteristic of wheats used with positive results in 1943.

Six samples of wheat, including the 5 harvesting samples, were fed to pullets thought to be susceptible. An attempt was made also to artificially inoculate wheat with various organisms isolated from 1943 wheats. From the results obtained, it appears that low germination, in the absence of a certain microflora, fails to produce pullet disease.

Effect of Corn Intake on Nicotinic Acid Requirement of Poultry
—In an attempt to establish the nicotinic acid requirement of New Hampshire chicks and turkey poult, it has been found that poult require a dietary source of nicotinic acid. Poult on a deficient ration show such symptoms as poor growth, diarrhea, perosis, reddening of the mouth parts, and, in severe cases, death. They require a higher level of nicotinic acid in their diet than is required by White Leghorn chicks. As yet, the exact level of this vitamin required for poult, or the effect of corn feeding, has not been determined.

In preliminary work with New Hampshire chicks, it has been found that the addition of the amino acid tryptophane to a nicotinic acid deficient ration (containing a high level of corn) partially counteracts the nicotinic acid deficiency.

Preventing Breast Blisters in Battery Chickens—Incidence of breast blisters has again been reduced by use of a new floor, the percent of birds showing commercially objectionable blisters being 0.00% at mean weight of 949 grams, and 2.74% at 1,399 grams.

Previous work indicated that the nature of the breast blister was an abcess-like accumulation induced by mechanical injury. A substantial reduction in the incidence of breast blisters was made when wires used in floor construction were larger in diameter and were brought closer together. During the past year, tests were made of a floor constructed of a "flat wire" which has a flat upper surface. This floor was made by a manufacturer according to specifications and consisted of $\frac{1}{4}$ -inch "flat" wire, spaced 6/16-inch apart.

Resistance to Pullorum Disease in Chickens—The rate of survival to pullorum disease of 164 chicks of Maryland resistant stock was 87.1%, whereas survival rate from pullorum clean stock averaged 20.8%, or a ratio of more than 4 to 1. A pre-

vious test in 1941, made at the time artificial inoculation upon a progeny test basis was inaugurated, showed a ratio of about 2.5 to 1. This difference in survival rate is largely the result of improvement in survival rate of the Maryland Rhode Island Reds, for the comparable ratio of survival reported in 1941 was 28.3% for the resistant Reds and 11.1% for pullorum clean stock.

Controlled chilling (5 hours at 60° F.) prior to inoculation again failed, as in 1944, to produce a significant difference in comparison with non-chilling, when measured by rate of survival. Chilled and inoculated R. I. Red resistant chicks survived at the rate of 87.5% and non-chilled at 91.0%, a difference which is probably not significant.

Seventeen of 35 dams' progeny tested for resistance had 100% livability in chicks.

Breeding Chickens for Efficient Feed Utilization—Egg production, egg weights, hatchability, feed utilization, body measurements, and progeny performance records have been kept on a relatively long-shanked and short-shanked pen of New Hampshires and of Barred Plymouth Rocks.

Differences have been particularly noticeable between the two pens of New Hampshires. The birds in the long-shanked pen lay larger eggs and tend to produce faster-growing, longer-shanked, better feed utilizing, and heavier broilers at 10 weeks of age. The short-shanked pen of New Hampshires tends to lay more eggs, somewhat smaller in size, and utilize feed best for egg production. The progeny from the short-shanked pen tends to feather earlier, but no significant difference is observed at 8 weeks of age. Hatchability in the two New Hampshire pens was about equal, but much better than in the Barred Plymouth Rocks.

No significant difference as related to shank length was observed in the two pens of Barred Plymouth Rocks.

Hatchability in Relation to Storage Temperature—The percentage hatchability of 4,545 New Hampshire hatching eggs averaged 85.0, 83.5, and 84.6 when stored at temperatures of 32° F., 38° F., and 52° F., respectively, for 1 to 7 days. Low temperatures within the ranges stated had no apparent effect upon hatchability or fertility. It is possible that the periods of low environmental temperatures were not long enough or severe enough to be effective. The extent to which it is possible to deviate from optimum temperature conditions may be governed by the normal hatchability of the breeding stock used.

Effect of Thiouracil on Egg Production—Injections of 0.1%, 0.2% and 0.3% solutions of thiouracil had no effect on rate of

egg production when injected on alternate days for a period of three weeks to different series of birds over an extensive period. No ovarian injury occurred. When thiouracil was fed at the rate of 0.2% of the diet of birds in production, egg production was decreased and all hens showed a condition of heavy molt.

Histological examination of the thyroid glands showed no colloid in the follicles of the gland. The colloid space was filled with cells. The appearance of the thyroid follicles indicated that the gland was inactive.

Requirement of Growing Chicks for Newer Members of the Vitamin B Complex—It has been found that a deficiency of one, or more, unidentified members of the B complex (present in liver) results in faulty pigment deposition in the feathers of New Hampshire chicks. Such feathers contain large white and black areas instead of the normal red. Work is in progress to determine, if possible, which factor in liver is responsible for preventing this deficiency.

In addition, it has been found that low levels of para-aminobenzoic acid in the ration appear to have a vitamin-like effect when added to an otherwise nutritionally complete ration. The growth obtained with such additions is significantly superior to growth obtained by control birds receiving a good typical broiler mash.

These results were obtained by feeding day-old New Hampshire and Rhode Island Red chicks special rations made of highly purified ingredients that were constructed so that a deficiency of any vitamin could be obtained. All that was necessary was to omit that vitamin from the ration when mixing. By using this procedure, preliminary studies have been made on the chick's requirement for para-aminobenzoic acid, inositol, and vitamins B_{10} and B_{11} .

PUBLICATIONS

BULLETINS

Number		Title	Authors
A32		The Value of Distiller's Rye Dried Grains in the Wintertime Rations for Pregnant Ewes—1939-40; 1940-41	J. B. Outhouse F. H. Leinbach DeVoe Meade
A33 (Tech)		The Discoloration of Sweet Potatoes During Preparation for Processing and the Oxidase in the Root	L. E. Scott C. O. Appleman Margaret Wilson
A34		War-Time Transportation of Farm Products and Farm Supplies by Motor Vehicles in Maryland	W. P. Walker S. H. DeVault P. R. Poffenberger A. M. Ahalt
A35		The Farm Real Estate Situation in Maryland	L. B. Bohanan S. H. DeVault W. P. Walker
A36		Improving Farm Property Assessments	W. P. Walker
A37		A Pest of Yucca	Elizabeth E. Haviland

SCIENTIFIC JOURNAL ARTICLES

Art. No.			
A90		Deflourinated Phosphates as Phosphorus Supplements for Chicks. H. R. Bird, J. P. Mattingly and H. W. Titus. <i>Journal of Association of Official Agricultural Chemists.</i>	
A91		The Effect of Two Different Methods of Feeding Cod-Liver Oil on Fat Test in Milk. L. A. Moore, G. T. Hoffman and M. H. Berry. <i>Journal of Dairy Science.</i>	
A92		Germination Differences of Wheat Utilized in a Study of Pullet Disease. George D. Quigley. <i>Poultry Science.</i>	
A93		Distribution of Proximate and Mineral Nutrients in the Drained and Liquid Portions of Canned Vegetables. Amihud Kramer. <i>Journal of American Dietetic Association.</i>	
A94		The Relationship Between a Low Carotene Intake and Urinary Excretion of Ascorbic Acid in Dairy Cattle. L. A. Moore and J. W. Cotter. <i>Journal of Dairy Science.</i>	
A95		The Formation of Diploid Plants from Haploid Peppers. Margaret G. Toole and Ronald Bamford. <i>Journal of Heredity.</i>	
A96		A Severe Leafspot of Soybean Caused by <i>Phyllosticta Sojae</i> Massal. Lindsay S. Olive and E. A. Walker. <i>Phytopathology.</i>	
A97		Insecticidal Aerosols for Pea Aphid Control. L. P. Ditman, Floyd F. Smith, Lyle D. Goodhue and T. E. Bronson. <i>Journal of Economic Entomology.</i>	
A98		Experiments with Aerosols Against Some Pests of Truck Crops. Floyd F. Smith, L. P. Ditman, and L. D. Goodhue. <i>Journal of Economic Entomology.</i>	
A99		The Application of DDT in Aerosol Form for the Control of Insects on Vegetables. Lyle D. Goodhue, Floyd F. Smith, and L. P. Ditman. <i>Journal of Economic Entomology.</i>	
A100		Effect of Heating, Under Various Conditions, and of Sprouting on the Nutritive Value of Soybean Oil Meals and Soybeans. J. Philip Mattingly and H. R. Bird. <i>Journal of Nutrition.</i>	
A101		Vitamin A and Carotene Content of the Blood Plasma of Dairy Calves from Birth up to Four Months of Age. L. A. Moore and M. H. Berry. <i>Journal of Dairy Science.</i>	

MISCELLANEOUS PERIODICALS, REPORTS, PROCEEDINGS, ETC.

Number	Title	Authors
30	Performance of Hybrid Corn in 1944. (Planographed bulletin).....	{ R. G. Rothgeb }
31	Sweet Corn Field Trials in 1944. (Mimeographed bulletin).....	{ R. G. Rothgeb }
32	Liquefied Gas Aerosols for Control of Vegetable Insects. (City Food Packer).....	{ L. P. Ditman }
33	Biological Notes on <i>Atypus Bicolor Lucas</i>	{ M. H. Muma Katherine E. Muma
34	Preliminary Investigation on the Measurement of Color in Canned Foods.....	{ A. Kramer }
35	New and Interesting Spiders from Maryland. (Washington Biological Society).....	{ M. H. Muma }
36	Prevention of Discoloration of Sweet Potatoes Following the Lye Peeling Process.....	{ L. E. Scott E. P. Walls H. A. Hunter
37	Selection and Handling of Fruit for Quality in the Freezer-Locker.....	{ A. L. Schrader }
38	Runoff Behavior of Small Agricultural Water- sheds under Various Land Use Practices.....	{ Harold W. Hobbs }

CURRENT PROJECTS
AGRICULTURAL ECONOMICS

A-18. ORGANIZATION, OPERATION AND BUSINESS ANALYSIS OF MARYLAND FARMS.

- A-18-u. Farm Management Adjustments and Factors Encountered by Farmers in Attaining Increased Production in the Wartime Program.
- A-18-v. Post-War Needs of Farmers in Maryland.
- A-18-w. Trends in Farm Mortgage Financing in Maryland.

A-19. THE FARM TAX PROBLEM IN MARYLAND.

- A-19-d. Problems in Farm Income Tax Reporting and Record Keeping.
- A-19-e. Changes Needed in the Maryland Tax System by Virtue of Wartime and Post-War Governmental Finance.
- A-19-f. Practical Technique for Detailed Classification of Farm Land for Property Tax Purposes.

A-26. MARKETING OF AGRICULTURAL COMMODITIES.

- A-26-j. The Effect of Changes in Transportation on Marketing Systems for Maryland Farm Products.
- A-26-k. The Problem of Priorities and Rationing in Relation to Agricultural Production and Marketing in Maryland.
- A-26-l. Prices Paid by Farmers for Commodities Bought.
- A-26-m. Problems in Marketing Arising from the War Emergency.

A-32. AN ECONOMIC STUDY OF LAND UTILIZATION IN MARYLAND.

- A-32-f. Farm Tenancy and Leasing Arrangements in Maryland.
- A-32-g. Inflationary Movements in the Farm Real Estate Market.

AGRICULTURAL ENGINEERING

- H-46. Concentrated Sprays. (In cooperation with Entomology.)
- Q-58-e. Dehydration of Horticultural Crops. (In cooperation with Horticulture.)
- R-6. Investigations of Grain Storage on the Farm.
- R-9. Sweet Potato Curing and Storing.

AGRONOMY

- B-39. Wheat—Hybridization and Selection.
- B-41. Barley—Hybridization for Smooth Awns.
- B-42. Hay, Forage and Pasture.
- B-43. Soybean Production in Maryland.
- B-44. Sweet Corn—Seed Production and Breeding.
- B-49. Improvement of Pastures in the Several Soil Provinces of Maryland.
- B-50. Development of Dent Corn Hybrids Specifically Adapted to the Corn-Growing Areas of Maryland.
- B-52. Effects of Different Short Rotations on Physical, Chemical and Pathological Conditions in the Soil and on Crop Production.
- B-53. Curing of Maryland Tobacco.
- O-27. Field Studies of the Fertility Requirements and Management of Important Soil Types in Maryland.
- O-28-b. A Study of the Formula and Analysis for Late Potatoes.
- O-33. Efficiency of Soil Fertility Management.
- O-43. Hydrologic Studies with Reference to Soil Moisture Conservation, Soil Fertility and Flood Control.
- O-44. A BIOCHEMICAL-BIOLOGICAL STUDY OF MEANS TO INCREASE THE ORGANIC COLLOIDAL COMPLEX OF THE SOIL.
 - O-44-a. A Study of the Chemical and Physical Changes Produced in a Soil by the Formation of the Organic Colloidal Complex.
- O-45. SOIL FERTILITY INVESTIGATIONS ON THE UNIVERSITY FARMS.
 - O-45-a. Influence of Various Fertilizer Ratios.
 - O-45-b. A Study of the Availability of Phosphate Material.
- O-46. A Study of Methods of Estimating the Available Potassium in Maryland Soils by the Rapid Soil Testing.
- O-47. The Available Supplies and Relative Agricultural Values of By-Product Liming Materials of Eastern Maryland.
 - Production of Grain Sorghums.
 - Tobacco Investigations. (Coop. with USDA.)
 - The Improvement, Production, and Use of Rye in Maryland. (Coop. with Maryland Distillers.)

AGRONOMY—SEED INSPECTION

- N-7. Inspection of Seeds Sold Throughout the State.
- N-8. Examination of Samples from Seeds Sold Throughout the State.
- N-9. Examination of Samples Submitted to the Laboratory.

ANIMAL HUSBANDRY

- C-6. Study of the Factors Which Influence the Production of Cured Pork Products of Desirable Quality and Palatability.
- C-7. The Relative Net Energy Values of Crushed Barley and Crushed Wheat in Comparison to Shelled Corn as Grain Feeds for Fattening Calves.
- C-8. Swine Breeding Investigations within the State of Maryland.
- C-9. Wintering Rations for Pregnant Ewes.
- C-11. Wintering Rations for Pregnant Beef Cows.

ANIMAL PATHOLOGY

- D-44. Bovine Trichomoniasis—Diagnosis, Treatment, Control and Eradication.
- D-46. Bang's Disease—Calfhood Vaccination.
- D-48. The Formulation of a Control Program Against Fowl Cholera.
- D-49. Diagnostic Tests Including Hematology in Swine Brucellosis and Capsule Formation in Brucella.

BOTANY

- F-9. Cytogenetic Studies in the Genera *Ipomoea*, *Gladiolus*, and *Tulipa*.
- F-10. The Effect of Inducing Polyploidy on the Drug and Oil Content of Some Plants.
- F-11. The Occurrence and Use of Haploid Plants Resulting from Twin Seedlings of Pepper, Cantaloupe and Other Vegetable Plants of Importance to Maryland Growers.
- F-12. The Native Plants of Maryland, Their Occurrence, Distribution and Economic Importance.
- J-72. Potato Improvement and Disease Control.

J-78. DISEASES OF FRUIT CROPS.

- J-78-a. Breeding Strawberries for Resistance to the Red Stele Disease Caused by *Phytophthora fragariae* Hickman.

J-80. DISEASES OF TRUCK AND CANNING CROPS.

- J-80-a. Disease Resistance in Potatoes with Special Reference to Wilt and Late Blight.
- J-83. Studies on Transmissibility of the Mild Streak Disease of Black Raspberries.
- J-84. Control of the Diseases of Soybeans.

- J-85. The Effect of Hormone and Chemical Treatments on Breaking the Rest Period of Seed Potatoes.
- J-86. Control of Stem Rot of Sweet Potato by Sprout Treatment.
- J-87. Treatments for Control of Seed and Soil-Borne Diseases of Vegetable Crops.
- K-7. Physiological and Biochemical Aspects of Vegetable Storage.

DAIRY HUSBANDRY

- G-11. Growth Data of Dairy Animals from Birth to Freshening Age.
- G-17. The Effect of Feeding Kelp Meal Upon Improving the Breeding Efficiency of Dairy Cattle.
- G-27. The Vitamin A and Carotene Requirements of Dairy Calves.
- G-28. Normal Age Variations of the Intra-ocular Tension of Dairy Cattle.
- G-29. The Effects of Vitamin A Deficiency on the Central Nervous System of Dairy Calves.
- G-30. Reproductive Efficiency in Dairy Cattle.
- G-33. Effect of Vitamin A on Milk Production.
- G-34. Chemical Changes in Milk Fat as Related to the Flavor of the Milk.
- G-35. The Analysis of Dairy Products.
- G-36. The Value of Vitamin A, Vitamin D and Nicotinic Acid as Cure of Calf Scours and Pneumonia in Calves.

ENTOMOLOGY

- H-29. INVESTIGATIONS OF THE BIOLOGY AND CONTROL OF INSECTS AFFECTING CANNING CROPS.
 - Sub. 5. Timing of Pea Aphid Treatments.
- H-40. BIOLOGY AND CONTROL OF TOBACCO INSECTS.
 - Sub. 1. The Tobacco Horn Worms.
- H-41. Biology and Control of Japanese Beetle.
- H-42. Ecological and Physiological Factors Concerned with the Hibernation of Insects.
- H-43. The Biology and Control of the European Corn Borer under Maryland Conditions.
- H-45. Practicability of Migratory Bee-keeping in Maryland.
- H-46. Concentrated Sprays.
- H-47. The Utility of Dichlorodiphenyl trichloroethane (commonly designated as DDT) in the Control of Poultry Ecto-parasites.

HORTICULTURE

- E- 2. The Effect of Rootstocks on the Production and Quality of Apples.
- L-68. Factors Affecting Maturity, Shipping and Storage Quality of Fruits.
- L-72. The Relation of Soil Moisture, Age of Plants, Size of Plants, Spacing of Plants and Use of Mineral Nutrients to Flower Differentiation, Fruit Yield, and Quality of the Strawberry.
- L-72-a. The Economic Application of Plant Thinning and Renewal Methods in Commercial Strawberry Areas in Maryland.
- L-73. ADAPTATION OF FRUIT VARIETIES AND NEW SEEDLINGS TO MARYLAND.
- L-73-a. The Growth and Fruiting Behavior of New Fruit Varieties, Strains and Seedlings.
- L-74. ENVIRONMENTAL FACTORS AND CULTURAL PRACTICES IN RELATION TO THE GROWTH AND FRUITING RESPONSES OF FRUITS.
- L-74-a. The Maintenance of Annual Bearing of Apple Varieties.
- L-74-b. The Relationship of Early Bearing to Subsequent Growth and Fruiting Behavior of Apple Varieties.
- L-74-c. Factors Associated with the Productiveness and Unproductiveness of the Delicious Apple.
- L-76. A Diagnosis of Certain Abnormalities in Growth and Fruiting of Peaches in Maryland.
- Q-58. FACTORS INFLUENCING YIELD AND QUALITY IN THE PRODUCTION AND PROCESSING OF VEGETABLES.
- Q-58-a. The Influence of Fertilizer Placements and Analyses on the Yield and Quality of Vegetables Grown for Processing.
- Q-58-b. Grading Raw Products.
- Q-58-e. Dehydration of Horticultural Crops.
- Q-67. The Value of Organic Matter in the Production of Vegetable Crops.
- Q-74. A Study of Regional Adaptation of Certain Vegetable Crops and Varieties in Maryland.
- Q-75. The Effect of Certain Factors on the Growth of Tomato Plants and the Quality of the Fruit.
- Q-76. BREEDING AND GENETICS OF VEGETABLE CROPS.
- Q-76-a. Breeding New Strains of Vegetable Crops.

Q-76-c. Breeding and Selection of a Fruitful Type of Lima Bean for Maryland.

Q-77. Crop Management Studies with Vegetable Crops.

Q-79. BASIC PHYSIOLOGICAL NUTRITION OF HORTICULTURAL PLANTS IN RELATION TO PLANT BEHAVIOR, FRUITFULNESS, ETC.

Q-79-a. Cation-Boron Relationships in Sweet Potato Nutrition.

POULTRY

M-32. PHYSIOLOGY OF REPRODUCTION OF POULTRY.

M-32-c. Endocrine Studies in Poultry.

M-32-d. Hatchability Studies in Poultry.

M-32-e. Role of Hormones in Broody Behavior in Hens.

M-32-f. Effect of Barring Gene on Hatchability, Feathering and Growth.

M-32-g. Hormones and Molting in the Domestic Fowl.

M-32-h. Hatchability Studies in Poultry.

M-32-i. Effect of Disturbance upon Oviposition in the Domestic Fowl.

M-33. FACTORS AFFECTING QUALITY OF POULTRY PRODUCTS.

M-33-b. Determining Relative Proportion of Different Parts of "Cut-Up" Chicken as Marketed and Price Relationship Between Drawn and "Cut-Up" Chicken.

M-34. THE EFFICIENCY OF POULTRY IN THE UTILIZATION OF FEED.

M-34-d. By Progeny-test and Breeding Methods, Developing Strains of Purebred and Crossbred Poultry Excelling in Efficiency of Feed Utilization, etc.

M-34-e. Medium Sized Strains of Turkeys with Certain Desirable Qualities.

M-35. NUTRITIVE REQUIREMENTS OF POULTRY.

M-35-a. The Place of Soybean Meal in Poultry Rations.

M-35-e. Phosphorus Requirement of the Chick as Affected by Source of Phosphorus and Vitamin D Intake.

M-35-f. Variability of the Feeding Value of Soybean Oil Meals.

M-35-g. The Requirement of the Growing Chick for Newer Members of the Vitamin B Complex.

M-35-h. Nutritive Deficiencies in Corn.

M-35-i. Amino Acids in Poultry Nutrition.

M-36. VIABILITY OF MARYLAND POULTRY.

- M-36-b. Resistance to Pullorum Disease in Chickens.
- M-36-d. Developing a Possible Test for the Presence of Avian Leucosis.
- M-36-e. The Role of Wheat in Pullet Disease of Chickens.
- M-36-f. Response in Feathering in Hybrid and Purebred Fowl Fed Selenium as a Check on Feather-Pigment Reactions Due to Leucosis.
- M-36-g. Effect of Long-time Thiouracil Treatment on Feather Pigmentation in Brown Leghorns and Other Breeds and Hybrids as a Further Check on Feather-Pigment Reactions Due to Leucosis.

M-38. Gas Fumigation for Used Baby Chick Boxes.

M-41. Studies on the Possibility of Distinguishing by Plumage Markings Between Homozygous and Heterozygous Barred Plymouth Rock Males Used in Hatchery Flocks.

M-42. The Effect of Brooding Environment Upon Poultry.

M-43. Effect of Hormones on Plumage, Growth, Fattening and Other Characteristics in Poultry.

- M-43-a. Relation of Thymus to Induced and Natural Molt.
- M-43-b. Determining Feather Genotype Through Hormone Effects in Lieu of Breeding.
- M-43-c. Effect of Thiouracil and Other Hormones on Growth in Chickens.

CHANGES IN PERSONNEL

Appointments:

W. B. Kemp, Director, February 17, 1945.
G. M. Briggs, Assoc. Prof. Nutrition, Poult. Husb., December 20, 1944.
E. W. Glazener, Asst. Professor, Poultry. Husb., September 18, 1944.
Ira A. Gould, Professor Dairy Manufacturing, October 16, 1944.
Mary H. Smith, Assistant in Horticulture, October 1, 1944.
Frank W. Taylor, Assistant in Dairy Husbandry, October 6, 1944.
Frieda Wertman, Assistant in Botany, July 16, 1944.

On Leave:

Albin O. Kuhn, Assoc. Professor, Agronomy, November 22, 1944.
Conrad Liden, Assistant Agronomist, July 26, 1944.
Ira D. Porterfield, Instructor Dairy Husbandry, October 26, 1944.

Resignations:

R. B. Corbett, Director, February 17, 1945.
Louise Marks, Instructor and Res. Asst., Horticulture, November 25, 1944
J. P. Mattingly, Assistant in Poultry Husbandry, December 31, 1944.
L. A. Moore, Assoc. Prof. Dairy Husbandry, March 31, 1945.
Howard B. Owens, Assistant in Entomology, January 31, 1945.
M. A. Petty, Assoc. Professor Plant Pathology, September 15, 1944.
Robert E. Phillips, Assoc. Prof. Poultry Husbandry, October 4, 1944.
M. Rabstein, Assistant Prof. Animal Pathology, July 21, 1944.
Jane L. Showacre, Assistant in Botany, December 31, 1944.
Marguerite Toole, Assistant in Botany, July 15, 1944.
Frieda Wertman, Assistant in Botany, December 31, 1944.
Mildred Whitlow, Assistant in Dairy Department, September 16, 1944.

FINANCIAL STATEMENT—JULY 1, 1944 to JUNE 30, 1945

FEDERAL FUNDS					
	Hatch	Adams	Purnell	Bankhead-Jones	
Balance June 30, 1944					
Appropriations for 1944-45	15,900.	15,000.	703.02	30,259.72	
Totals	15,900.	15,000.	703.02	30,259.72	
Receipts from sources other than Federal 44-45:					
State appropriations for agricultural investigations					
Industrial Grants					
Sales and Miscellaneous					
Balance brought forward July 1, 1944					
Total	12,456.62	12,283.29	48,852.30	23,238.65	78,061.95
Expenditures:					
Personal Services	193.66	425.22	2,280.76	1,016.66	2,916.82
Travel	2.92	0.58	28.36	20.33	259.63
Transportation					
Communication Service	44.16	0.34	5.82	4.26	1,012.50
Rents and Utility Services					
Printing and Binding					
Other Contractual Services	3.15	51.31	505.14	633.32	10,932.68
Supplies and Materials	1,391.21	2,032.26	5,531.43	4,593.26	57,151.11
Equipment	223.59	198.60	2,221.94	744.13	13,548.21
Land and Structures	574.69	134.22	4,196.04
Contributions to Retirement					9,594.20
Balances June 30, 1945					
Totals	15,000.00	15,000.00	60,000.00	30,259.72	235,269.85

* Including Bankhead-Jones offset funds.

The Bulletins Named Below Are Available For Distribution.

These Bulletins are sent free of charge to any address upon application.

EXPERIMENT STATION BULLETINS

Bulletin No. 421, Oct., 1938, An Economic Survey of Farm Orchards in Counties
Near Baltimore, Md., and Washington, D. C.

" " 422, Oct., 1938, Standard of Living on Carroll County, Maryland, Farms.

" " 424, Jan., 1939, An Economic Study of Land Utilization in the Tobacco
Area of Southern Maryland.

" " 425, Feb., 1939, Variety and Strain Trials of Alaska and Sweet Types
of Peas for Canning in Maryland.

" " 426, Mar., 1939, An Economic Study of the Hatchery Industry in Md.

" " 427, July, 1939, The Production and Marketing of Honey in Maryland.

" " 428, Aug., 1939, Qualities of Hams and Rapidity of Aging As Affected
By Curing and Aging Conditions and Processes.

" " 429, Aug., 1939, Marketing Maryland Turkeys.

" " 430, Oct., 1939, Economic Analysis of the Baltimore Egg Market.

" " 431, Jan., 1940, An Economic Study of the Maple Products Industry in
Garrett County, Maryland.

" " 432, Feb., 1940, Types of Farming in Maryland.

" " 433, May, 1940, Potato Disease Control Studies on the Maryland East-
ern Shore.

" " 434, June, 1940, Marketing Farm Products Through Community Auctions.

" " 435, July, 1940, Measuring Inequalities in Farm Property Assessments
in Maryland.

" " 436, Aug., 1940, Production and Marketing of Maryland Sweet Potatoes.

" " 437, Oct., 1940, Rural Community Organization in Washington and
Frederick Counties, Maryland.

" " 438, Nov., 1940, The State Fiscal Capacity of Maryland and Other
Selected States.

" " 439, Mar., 1941, Studies on Corn Ear Worm Control.

" " 440, Apr., 1941, Classification of Agricultural Areas, Frederick County,
Maryland.

" " 441, May, 1941, Status and Trend of Agricultural Cooperation in Mary-
land.

" " A1, July, 1941, Feed and Other Costs of Producing Market Eggs.

" " A2, Aug., 1941, Characteristics of Farm Property Assessments in Mary-
land, After the Last Reassessment.

" " A3, Oct., 1941, Economic Aspects of the Distilling Industry in Mary-
land.

" " A4, Oct., 1941, The Potato Enterprise in Garrett County, Maryland.

" " A5, Nov., 1941, Farmers' Mutual Fire Insurance in Maryland.

" " A6, Nov., 1941, Value of a Fermentation By-Product in Poultry Needs.

" " A7, Mar., 1942, The Pistol Casebearer in Maryland.

" " A8, Mar., 1942, Short-Term Credit on the Lower Eastern Shore of
Maryland.

" " A9, Apr., 1942, Extent of Changes and Equalization in Farm Property
Assessments By Reassessing in Maryland.

" " A10, May, 1942, Poisonous Plants of Maryland in Relation to Livestock.

" " A11, May, 1942, Where Frederick and Salisbury, Md., Get Their Food
Supplies.

" " A12, May, 1942, Relation of Vitamin A to Egg Production and Hatch-
ability.

" " A13, June, 1942, Soybean-Millet Molasses Silage for Dairy Cows.

" " A14, July, 1942, Effects of Waxing and Pre-storage Treatments Upon
Prolonging the Edible and Storage Qualities of Apples.

" " A15, Aug., 1942, Labor Requirements For Selected Crops in Maryland.

" " A16, Aug., 1942, The Broiler Industry In Maryland.

" " A17, Sept., 1942, Cost And Advisability Of Raising Dairy Heifers.

" " A18, Oct., 1942, Wartime Prices And Agriculture.

" " A19, Dec., 1942, County Road Use And Finance In Maryland.

" " A20, Dec., 1942, Cattle Feeding Experiments, 1938-1939. 1939-1940.
1940-1941. 1941-1942.

" " A21, Jan., 1943, Community Organization in Charles County, Maryland.

" " A22, Feb., 1943, The Curing and Storage of Maryland Golden Sweet
Potatoes.

" " A23, Mar., 1943, Retail Prices and Quality of Canned Vegetables.

" " A24, Mar., 1943, Pea Aphid Studies in Maryland.

" " A25, May, 1943, Trend in Wartime Farm Prices in Maryland.

" " A26, July, 1943, Selection and Genetic Responses in a Segregating Maize
Population.

" " A27, Sept., 1943, Factors Affecting the Nutritive Value of Soybean Oil
Meals and Soybeans for Chickens.

" " A28, Nov., 1943, Propagation of Apple and Quince by Layering.

" " A29, Dec., 1943, Wages and Housing Facilities for Farm Labor.

" " A30, Jan., 1944, Manual for Milk and Cream Testers in Maryland.
The War-Time Machinery Situation on Farms in Mary-
land.

" " A31, Apr., 1944, The Value of Distillers' Rye Dried Grains in the Win-
tering Rations for Pregnant Ewes.

" " A32, July, 1944, The Discoloration of Sweet Potatoes During Prepara-
tion for Processing and the Oxidase in the Root.

" " A34, Nov., 1944, War-Time Transportation of Farm Products and Farm
Supplies by Motor Vehicles in Maryland.

" " A35, Jan., 1945, The Farm Real Estate Situation in Maryland.

" " A36, Jan., 1945, Improving Farm Property Assessments.

" " A37, Apr., 1945, A Pest of Yucca.

Dr

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